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Invention:

Structure to Enclose a Safe Zone on and above a Mattress and its Support

Permitting Limited Movement Only of a Bedridden Patient in the Safe Zone

Cross Reference to Related Earlier Filed Documents:

This invention was the subject of a Disclosure Document filed by the applicant, dated June 5, 2001 by the Applicant under the Disclosure Document Program, Disclosure Document No. 495830.

This invention was disclosed in a provisional patent application filed by your applicant on April 1, 2003 and assigned application number 60/459,484 for a structure to enclose a safe zone on and above a mattress and its support on a bed permitting limited movement only of a bedridden patient; and, the applicant requests and claims priority based upon the disclosures in that provisional application.

Field of the Invention:

This invention is for a bed and relates, specifically, to a patient confining structure for a bed. The patient confining structure is sometimes referred to herein simply as "the device."

The bed with which the device may be used is either a conventional one or a more elaborate hospital bed, and, as is conventional, has a support for a mattress on which a person may rest; or, in a preferred embodiment the device may stand alone, as shown in figure 1.

The invention includes an enclosure structure which is adjustable to accommodate a range of different size bed mattresses. It has associated supports on it on which a mattress may be supported when installed. More particularly, the enclosure structure is, in general, a combination which is composed of a) a frame work which includes a mattress support, and b) a shroud of sturdy mesh or open work net material covering, surrounding or enshrouding the framework. The device limits movement of a bedridden patient on the mattress surface to unrestricted movement on the bed mattress while safely limiting or confining movement to only that space above the mattress, because it is enclosed or fenced.

The Invention Generally

Generally, the invention defines a person confining safe zone in which maximum freedom of movement, albeit limited movement, may be enjoyed by the patient on the mattress for those special situations where the person is a patient who requires that for medical reasons.

In general, the device is composed of a) a skeletal frame work of interconnected mating components to be assembled and which may be removably secured either to the mattress support of a bed or it may stand alone supporting a mattress; and, in either event, b) a mesh or net shroud, which has a normally closed access opening. In use, when the device is assembled, it is installed on either a bed or it stands alone and a network surrounds the frame work at least peripherally all the way around it. An opening is provided to administer to the patient as required, or as desired; however, it is normally closed by a suitable fastener means or closure means which is operable to open and close the opening, but only by one outside the device.

Background of the Invention:

In the past, there has been a need to confine some persons on a mattress of a bed for various reasons. Some are frail and cannot get out of bed while they do have enough energy to roll off of it. Others are strong enough to get out of bed partway but are so weak they are apt to fall while actually in the act of getting out of the bed. Yet; others are very weak and, hence, likely to fall immediately or shortly after arising if not attended by another, such as a nurse. Indeed, some are children in pediatric wards, which includes hyperactive children. Still others are confined for psychiatric maladies. Importantly, there are a growing number of elderly patients who are literally in bed for the remainder of their lives; some are in hospices, while others are in private facilities or at an at-home environment. Whatever the location and reason, as much freedom of movement as is possible by a bedridden person is beneficial for most of them to the extent possible and tolerable, if not all of them: In short, movement, albeit limited, is good, both physically and psychologically. This invention permits a bedridden patient to have freedom for some relatively unrestricted movement while on a bed mattress which is limited to, or confined to, movement only on the surface of the mattress of the bed; and which, nevertheless, helps the patient to avoid the feeling of being greatly restrained and locked in a cage, because the surrounding mesh network is an open work through which air may freely circulate and which does not unduly limit vision or communication with persons on the outside of the device..

To keep persons from falling from bed, some patients have in the past simply been tethered, which is known to be dangerous, witness the plight of a dog entangled in a chain. Other patients are placed on a mattress on the floor, so, if a fall does take place, it is only for a very short distance. But sleeping on the floor, where there are bugs and whatnot, is, of course, primitive and not tolerated by most civilized persons, whether disabled or not. That is the main reason why, almost universally, beds provide an somewhat elevated generally horizontal mattress support.

To avoid the problem of patient falls from an-above-the-floor bed, bed rails are sometimes used. These have proven to be dangerous because the limbs of some such patients often become trapped between the mattress and the bed rail, or, indeed in the bed rail itself. This can cause serious injury and even death. Moreover, some patients, while physically able to climb up onto bed rails in an effort to get over them, are not able to complete the process of getting out of bed safely. This often results in such a person finding that the reward for effort expended is but a very precarious perch preceding a serious or deathly fall. There, such unfortunates sometimes balance as best they can on the bed rails and cling for dear life dangerously exhausting themselves, while others just give up and fall injuring themselves. It is not uncommon, therefore, to strap patients in bed or use other restraints which are quite inhumane in an effort to avoid falls and consequent injuries. With such measures there are many well known problems such as: problems of reduced circulation, muscle atrophy, decubitus ulcers, anxiety, feelings of helplessness, injuries from attempts to escape, interference with medical appliances for administering to the patient, hernias, respiratory ills, etc. In the face of all, patients, who should not, still do try to get out of bed, to escape its confines. sometimes in an effort just to go to the bathroom in private, or for some other relatively innocent reason.

Summary of the Invention:

This invention addresses this serious problem, a most dangerous problem, which all too often results in needless serious fall injuries. The seriousness of this problem area has been discussed at various committee meetings of the U. S. Senate and the House, as well as by corresponding legislative bodies of many of the various states, and other governmental administrative agencies as has been described in numerous association articles and various study

reports.

Generally, the invention provides an improved structure that defines a person-confining-safe-zone above a mattress and its support within which maximum freedom of movement may be enjoyed by the patient on the mattress, albeit a limited freedom. The safety zone above the mattress is about three feet in height at least. It is most useful for those special situations where the person is an elderly or frail patient.

In general, the patient confining structure is composed of a) a skeletal frame work of interconnected mating components to support a mattress, and b) a net or mesh shroud or fence connected to the frame work for the mattress. The net shroud or fence is provided with a main opening with a gate means to administer to the patient as required, or as desired; however, it has a suitable fastener means, closure means or locking means which is operable to open and close the gate of the opening, but only from outside of the enclosed space of the device. This described structure confines the patient to movement only on the surface of the mattress.

In summary, this invention has an adjustable framework which, preferably, can be sized to fit different size mattresses and beds in the ranges most often encountered. In use, the framework may be attached to a bed or a mattress may be positioned on the framework as it stands alone. In either case, a network is secured to that frame work, which enshrouds or surrounds a safe zone on and above the mattress surface and which, in use, permits limited and safe movement there for a person who requires that; and, additionally, it provides access to the patient by one from outside the device, but not egress by the person in the device without assistance by one from outside of it.

Objects of the Invention

Some of the objects of the invention are the structure set forth in the numbered textual

portions comprising the following specification and description of an illustrative embodiment of the invention.

Overall objects of this invention are to provide the device described herein, or equivalent structure, for a mattress which may be used on a range of beds of different sizes or may stand alone, which addresses the long outstanding problems described above, is safe for a person requiring its use and permits a confined patient to be administered medicine and care, and is otherwise well adapted for the purposes described explicitly and impliedly herein.

Description of the Drawing Illustrations:

In accord with the foregoing objects the invention will now be described on reference to the accompanying drawing illustrations in which:

Figure 1 is a general view of the device..

Figure 2 is a perspective view of the framework which as indicated may have support legs of any desired length..

Figure 3 is a general partial exploded view of the device illustrating its assembly .

Figure 4 is a partial view of that portion of Figure 1 indicated at the upper left of Figure 1 and taken on the plane indicated by the arrowed line 4-4.

Figure 5 is a partial view of that portion indicated by the legend "Fig.5" at the lower right of Figure 1.

Figure 6 is a partial perspective view of a connector means seen at the top corners of the device illustrated in the exploded view, Figure 3.

Description of Preferred Embodiments:

In general, the invention is of a device which stands alone or is attached to a bed. It provides a mattress support for a mattress to accommodate a person at rest on the mattress; and, it is composed of a frame work including means to secure the framework in upstanding relation peripherally about the supported mattress. The frame work includes corner posts each extending a generally common distance above the mattress and the mattress supporting frame work; and, it further includes members connected to and spanning the upper ends of the corner posts defining a safety zone space between the corner posts and between the members and above a supported mattress. This safety zone space is fenced in. To this end the invention also includes a net work having an inside and an outside surface supported on the frame work and surrounding, if not enshrouding, the space and, also, suitable means to attach the net and frame work together. The network has a main or access opening and a normally closed gate or closure means secured on the network, such as by a zipper means with an operator lever, or hook and eye fastener means, to open and close the gate of the opening from the outside surface of the net only and not from within the safety zone space. A suitable connector for the corner posts and spanning members is illustrated in Figures 3 and 6. The frame work includes legs of a length as preferred or required when it stands alone supporting a mattress, the lower ends of which may be provided with wheels, as is often found on institutional equipment or, indeed, in the home or a care taker place. The framework includes at least a partial floor or floor means to support the mattress.

Referring to Fig. 1, there is an illustration of the mattress 10, which may be in a washable casing, on a mattress support 12 of the framework 14 of the invention. The invention includes a mesh network or fence 16, which, in assembly, enshrouds, or at least, surrounds the framework 14 in the sense of providing a fence to provide an open work and fence like barrier peripherally around a safe zone on the mattress, whether it is on a bed on which the device has been installed or

whether the device stands alone. The mattress support 12 may be of a conventional construction which has legs and accordingly is elevated, or, indeed, it may be quite low compared to the conventional bed height. Its dimensions and configuration as well as its height may even be adjustable to raise or lower portions of it, for example, either the foot zone, or the head zone or, for that matter, both zones.

The framework includes upstanding corner posts, one at each corner of the mattress and of the support, as at 17, 18, 20, 22. Each of these posts is preferably of a common length and has an upper and a lower end zone respectively. The upper end zones 24, 25 26, and 27 of the posts are usually about three feet above the upper edge surface of the mattress. These upper post ends are spanned by upper elongate members, a first pair of side members of common length 28 and 30 and a second pair of members, a head member and a foot member, of a shorter common length 32 and 34.

The adjacent upper end zones of the posts 17, 18, 20 and 22 and of the members 28, 30, 32 and 34 are connected by connectors 36, 38, 40, and 42 respectively, see figures 2, 3 and 6. Referring to figure 6, each connector includes interconnected tubular portions, such as 44, 46 and 48. The bores of the upper ends of the tubular corner posts are of a common cross sectional shape and size to mate with the portions 44 of the connectors. More particularly, each connector is configured with a pair of right angularly coplanar tubular portions 46 and 48 and a portion 44 perpendicular to the common plane at the juncture 50 of the coplanar portions. Therefore, in assembly, a skeleton framework is formed when the ends of each of the upper members and of the upstanding corner posts legs are mated by the connector portions 36, 38, 40 and 42.

Preferably, each of the post lower end zones 49 is provided with a gusset plate 29 or brace with a portion having a surface 31 which confronts one of the outer side surfaces of the mattress.

A partial mattress support surface, or partial floor means, 33, is provided. Lateral members 35, 37, one at the head of the bed and one at the foot of the bed, are provided. If desired, in order to provide for adjustability, each of these may be composed of a pair of elongate members 39 and 41 the ends of which overlap. These may be secured together by bolts and wing nuts, 43, 44.

In the case where the device is to be installed on a bed, the partial floor of the device is positioned on the bed's mattress support and tied to it by any suitable means to maintain it in a generally congruent position with respect to the mattress and its support. The means to tie may be of any suitable materials, for example wire or strips of cloth material may be used in a most simple form. Lateral planks, or members, each with a pattern of holes for receiving bolts are common expedients used in the field. . These locations of mating bolts and various hole patterns correspond to patterns in existing hospital bedframe styles.

The framework members may be extendable to elongate their respective lengths which constitutes adjustment means to accommodate different size beds. In a preferred embodiment the members are in two portions which telescope with respect to one another slidingly. To this end the bolts may be passed through slots which permits this type of length adjustment of the members' overall lengths, sometimes referred to a pin and slot connection.

The open net work, whether a shroud or a fence, 16 is sized to fit closely over the frame work 14. It may be in the form of a hood having a roof portion and a skirt or it may constitute a fence like portion; or it may be primarily merely a fence like portion about the corner posts. In either construction, it is quite "see-through," being of crisscrossed and spaced twisted thread bundles of strands of extruded plastic filaments, such as nylon filaments or other suitable material. The lower portion of the shroud or skirt of the fence like portion is suitably reinforced as by the webbing strip 71 preferably of nylon also, which has proven to be very strong, for example as used

in parachute margin portions or seatbelts. The lower rim of the network is secured to the framework parts that make up the partial floor means by ties, laces or any of many suitable means so that it cannot be lifted or breached from within the safety zone space when in use. Eye openings 63, see figure 4, may be provided to accommodate laces or ties for fastening the lower rim or skirt of the network to the framework. These may be used to create limited access openings for tubes to feed a patient or for administering medicines through catheters.

Referring to figure 1, the opening 61 in the shroud or fence provides access and is also reinforced along its edges as at 63, see figure 4.. A suitable gate or closure means 60 generally is provided for the opening which may provided with a zipper means 65.. The closure means 60 may include operator means of any suitable type. Interconnecting hook and eye pads are a common means which is acceptable or clips as shown composed of a plurality of spaced conventional sets of matching hook and eye members 71, 72 provided on the reinforcement about the opening and at various other locations may be provided. These closure operator members are on the outside surface of the fence or shroud and are not accessible to one within the assembled device.

Referring to figure 6, the connector means for the framework corners in the preferred embodiment is seen to be suitable for connecting the upper end zones of the posts to the horizontal members. Each is preferably of a one piece construction of molded plastic in the rigid range. Each includes a corner zone, a pair of coplanar right angularly diverging and extending tubular portions and a downwardly extending portion. Each of the end faces of the portions is open into the column or long recess in the portions which is companionately configured and sized to mate with the ends of the posts and members, as shown in the drawings. A conventional a spring biased button with an radially extending tip to engage a mating hole in the wall of an associated member may alsao be provided to hold the pieces together while in assembly.

Operation of the Device:

In use, the mattress support floor of the device receives and supports a mattress of conforming shape, the floor being fitted and tied or otherwise suitably connected to a conventional mattress support of a bed. In another use, the device may simply stand alone. Once a mating size mattress is positioned on its support floor within the framework between the posts and on the partial floor of the device, the corner posts are suitable connected to the framework in upstanding relation parallel to one another with one being closely adjacent and outboard of each mattress corner. The upper end zones of the posts and confronting ends of the upper members are interconnected as illustrated in figure 3 completing the framework. The open network mesh fence or shroud is then positioned as shown and its lower skirt margin is connected to the framework so a patient cannot tunnel out, the operators of the ties being exteriorly accessable only. Thereafter, a person in the device on a mattress may be administered through the main opening from the outside the device and through smaller openings for a catheter system which may be opened as required between the framework and the lower skirt or margin of the network which is tied to the framework by laces for example. In either case the person inside the device cannot reach through the net material or between the mattress and network in order to open the interior from within the safety space of the device.

While the inventions have been shown and are described in preferred embodiments and claimed herein, it is recognized that departures may be made from the precise structure disclosed which are nevertheless within the spirit and scope of the invention; and, therefore, the invention should not be limited except by the specific words of the claims that follow and within the range of the doctrine of equivalents.

It will be understood that, while preferred embodiments of the present invention are

presented, without departing from its overall spirit and scope, it would be practical to vary the disclosed apparatus by substituting obvious equivalents to those necessary in order to describe the invention without deviating from the inventive concept and embodiment since the disclosed teaches an example of for a device to provide a patient safe zone on a mattress for a frail patient.. In general, numerous of the individual elements and functional aspects described may be modified somewhat within the spirit and scope of the invention which therefore should not be limited to the details of this precise disclosure; but, rather, the invention should be awarded the full range of protection implicit in the described invention. To enumerate and draw all possible variations would render this disclosure prolix. Wherefore, it will be understood that the structural elements of the apparatus, disclosed necessarily in describing these embodiments, can be replaced by other means which are obvious while still conforming to this invention.

Unless defined otherwise, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention relates. Any methods and materials similar or equivalent to those described can be used in the practice or use of the present invention; and, accordingly, all equivalent structure disclosed in various publications and patents of equivalent elements of this invention are incorporated herein whether by direct reference or not.

While the principles of the invention have been made clear and are illustrated in the drawings illustrating the device, there will be immediately obvious to those skilled in the art that there are many modifications of structure, arrangements, proportions of the elements, materials, and components used in the practice of the invention which are particularly adapted to specific environments and operative requirements without departing from the disclosed invention's principles.